Indiana Michigan
Power Company
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INDIANA MICHIGAN POWER

February 23, 2005

AEP:NRC:2573-12

Docket No. 50-316

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, DC 20555-0001

Donald C. Cook Nuclear Plant Unit 2
LICENSEE EVENT REPORT (LER) 50-316/2003-002-01
SUPPLEMENTAL LER FOR UNIT 2 REACTOR TRIP DUE TO
INSTRUMENT RACK 24 VOLT DC POWER SUPPLY FAILURE

In accordance with the criteria established by 10 CFR 50.73, Licensee Event Report System, the following supplemental report is being submitted:

LER 50-316/2003-002-01: "Supplemental LER for Unit 2 Reactor Trip due to Instrument Rack 24 VDC Power Supply Failure."

This LER supplement reports the analysis, root cause and corrective actions to prevent recurrence of the event.

This supplemental report exceeds the expected submission reporting date estimated in the original LER. Indiana Michigan Power Company is revising the procedure governing submittal of LERs to provide specific time requirements for supplemental LERs.

There are no commitments identified in this submittal. Should you have any questions, please contact Mr. Toby K. Woods, Compliance Supervisor, at (269) 466-2798.

Sincerely,

Joseph N. Jensen
Site Vice President

RAJ/jen

Attachment

IE22

c: J. L. Caldwell – NRC Region III
K. D. Curry – AEP Ft. Wayne
J. T. King – MPSC
C. F. Lyon – NRC Washington DC
MDEQ – WHMD/HWRPS
NRC Resident Inspector
Records Center - INPO

NRC Form 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES 6/30/2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE

Supplemental LER for Unit 2 Reactor Trip due to Instrument Rack 24 Volt Power Supply Failure

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	05	2003	2003	-- 002 --	01	02	23	2005	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER Specify in Abstract below or in NRC Form 366A
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
D.C.Cook Regulatory Affairs Contact, Toby Woods	(269) 461-2798

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	JG	N/A	Lamda	Yes						

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
	YES (If Yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On February 5, 2003, at 2058 hours, Donald C. Cook Nuclear Plant (CNP) Unit 2 tripped due to the failure of both redundant 24 volt direct current (VDC) control group cabinet #3 power supplies. This caused the feedwater regulating valve for steam generator #23 to fail closed and the reactor to trip on a feed-flow/steam-flow mismatch coincident with low level in the #23 steam generator. All control rods inserted, the turbine tripped, and the auxiliary feedwater pumps started as expected. Following the reactor trip, the operators closed the main steam isolation valves to limit cooldown. This LER supplement is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A) and NUREG-1022, Section 5.1.5. This LER reports the root cause, corrective actions to prevent recurrence, and safety significance of the event.

The root cause of the event was age degradation of the Control Group III power supplies. Corrective actions included replacement of the control group power supplies and implementation of an optimized preventive maintenance program to address timely replacement of critical power supplies.

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17. NARRATIVE *(If more space is required, use additional copies of NRC Form (366A)*

Conditions Prior to Event

Unit 1 - Mode 5, 0 percent power
Unit 2 - Mode 1, 100 percent power

Description of Event

At 2058 hours on February 5, 2003, the Unit 2 reactor automatically tripped from 100% power. The direct trip signal was low steam generator water coincident with steam flow/feed flow mismatch in #23 steam generator [JB]. This condition was caused by the failure of the 24 VDC dual power supplies in rack 21 of control group III, which caused the steam generator feedwater regulating valve (2-FRV-230) [SJ] to #23 steam generator to fail closed. After recognizing the failed feedwater regulating valve and taking actions to restore feed flow manually, it was determined that steam generator level was not recoverable and a manual reactor trip was directed. Just before the manual trip could be initiated, an automatic trip occurred.

The Reactor Coolant System (RCS) [AC] cooldown experienced after the trip was greater than expected. As temperature reached 539 degrees F and continued lowering, the steam generator stop valves were tripped closed, as directed by the Response Not Obtained guidance for Step 1 of procedure ES-0.1, Reactor Trip Response. This action terminated the cooldown. RCS temperature remained above 538 degrees F, and RCS pressure reached a low of approximately 1920 psig. The RCS cooldown is primarily attributed to sustained high auxiliary feedwater [BA] flow following the reactor trip. The turbine driven auxiliary feedwater pump was secured 14 minutes after the reactor trip.

The level in #23 steam generator dropped to less than normal for a reactor trip. The nominal level is 50% wide range, and level fell to approximately 33%. This is attributed to the feedwater regulating valve failing closed for this steam generator, as well as the steam load of the turbine driven auxiliary feedwater pump. The #22 steam generator was also affected to a lesser degree. The loss of the 24 VDC power supplies also resulted in the loss of the refueling water storage tank (RWST) low-level alarm function. There were no complications from loss of the low-level alarm function.

In accordance with 10 CFR 50.72(b)(2)(iv)(B), the reactor shutdown is reportable as a valid actuation of the reactor protection system. This LER Supplement is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A) and NUREG-1022, Section 5.1.5.

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17. NARRATIVE *(If more space is required, use additional copies of NRC Form (366A)*

Cause of Event

The root cause of event was specific component age degradation of the Control Group III power supplies. Internal components failed on the power supply's input and output circuits. The primary failure mode for this component is attributed to age.

A contributing programmatic cause to this event was untimely corrective action. Following a forced outage caused by power supply failure in May 2002, a decision was made to delay replacement of all installed 24 VDC power supplies until the next refueling. This was due, in part, to the organization being unaware of an EPRI recommendation to replace critical power supplies at an age of 7.5 years, and an interim measure had been written to inspect the power supplies on a weekly basis. Additionally, the stock of replacement power supplies was depleted during the forced outage in May 2002.

Analysis of Event

The safety significance of this event was determined to be low. Although several automatic control functions were lost and multiple alarms were generated, review of operations procedures and actions determined that adequate alternate indications and controls were available to effectively mitigate the complications encountered during trip recovery. The RCS cooldown experienced after the trip was greater than desired, prompting closure of the main steam isolation valves. Although this was considered a loss of normal cooling pathway, it was as directed by emergency operating procedure, response not obtained column. Cooldown rate was controlled by auxiliary feedwater flow.

There was no impact on the health and safety of the public because of this event.

Corrective Actions

The Unit 1 and Unit 2 Control Group and WSI Cabinet 24 VDC Power Supplies were replaced with new or remanufactured power supplies. (CRA 03036056-04,-05)

An optimized preventive maintenance program for critical power supplies was developed and implemented. (CRA 03036056-03,-20)

Previous Similar Events

LER 50-316/2002-005-00, Unit 2 Trip Due to Instrument 24 Volt DC Power Supply Failure. The root cause for LER 50-316/2002-005-00 was age-related failure of components within critical power supplies. A contributing factor to the event was not having a provision for periodic monitoring of the 24 VDC power supplies.

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17. NARRATIVE *(If more space is required, use additional copies of NRC Form (366A)*

A corrective action from LER 50-316/2002-005-00 was routine monitoring of the 24 VDC power supplies. However the prescribed monitoring task was not rigorously performed. This factor, in addition to the decision to delay replacement of the power supplies until the next refueling, contributed to LER 50-316/2003-002-01 event.